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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference AJC/P100377WO		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/02870	International filing date (day/month/year) 03.07.2003	Priority date (day/month/year) 03.07.2002	
International Patent Classification (IPC) or both national classification and IPC G21F9/00			
Applicant BRITISH NUCLEAR FUELS PLC et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 2 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand  21.01.2004		Date of completion of this report  03.02.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer  Deroubaix, P  Telephone No. +49 89 2399-7592 	

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/02870

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, Pages

1-5 as originally filed

### Claims, Numbers

1-12 filed with telefax on 25.10.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-12
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-12
Industrial applicability (IA)	Yes: Claims	1-12
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: WO 96/02918 A (TERRA ENVIRONMENTAL) 1 February 1996 (1996-02-01)
- D2: US-A-4 010 108 (HANSEN LARRY J ET AL) 1 March 1977 (1977-03-01)
- D3: US-A-4 839 102 (BERNARD ANDRE ET AL) 13 June 1989 (1989-06-13)
- D4: US-A-4 416 810 (NOAKES JOHN E) 22 November 1983 (1983-11-22)
- D5: US-A-4 792 385 (SNYDER THOMAS S ET AL) 20 December 1988 (1988-12-20)
- D6: US-A-4 931 192 (MCBRIDE MICHAEL A ET AL) 5 June 1990 (1990-06-05)

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of the claims does not involve an inventive step in the sense of Article 33(3) PCT.

**Claim 1**

Document D1 discloses (see claims 31,33,34 and 40 of D1) a method for the encapsulation of a nuclear material which comprises treating the material with an encapsulant which comprises a cementitious material and curing said cementitious material. D2-D6 also disclose the same method.

The implementation of such a method for the encapsulation of uranium metal, Magnox fuel elements or Magnox fuel element debris is not explicitly mentioned in any of documents D1-D6, however the encapsulation of such products by way of this method cannot be considered as involving an inventive step.

In case this method has not to date been implemented for the encapsulation of such products, this would probably lie in the fact that the compatibility of the materials involved is creating problems (see in this respect e.g. D1, page 5, lines 9-23; D2, column 1, line 42 - column 2, line 31; D3, column 1, lines 31-37). But the way of solving such problems is in no way touched on in the present application, so that claim 1 not

only lacks involving an inventive step, but also fails to give any hint for solving a problem.

The subject-matter of claim 1 does not involve an inventive step and does not satisfy the criteria set forth in Article 33(3) PCT.

**Claim 2**

In the method of D1, the cementitious material comprises Portland cement.

Thus, the subject-matter of claim 2 does not involve an inventive step and does not satisfy the criteria set forth in Article 33(3) PCT.

**Claim 3**

In the method of D1 (see claims 22 and 23), the cementitious material additionally comprises one or more inorganic fillers.

Thus, the subject-matter of claim 3 does not involve an inventive step and does not satisfy the criteria set forth in Article 33(3) PCT.

**Claim 4**

In the method of D1, the cementitious material is provided in the form of an aqueous composition.

Thus, the subject-matter of claim 4 does not involve an inventive step and does not satisfy the criteria set forth in Article 33(3) PCT.

**Claim 5**

In the method of D1 (see claim 8), the water content of the composition is in the region of 40-50% by weight.

Thus, the subject-matter of claim 5 does not involve an inventive step and does not satisfy the criteria set forth in Article 33(3) PCT.

**Claim 12**

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Referring to D1, it appears that the subject-matter of claim 13 does not either involve an inventive step.

Furthermore, referring to any one of documents D2, D3 and D4, the subject-matters of claims 1,3-6,13 appear to lack involving an inventive step, and referring to D5 or D6, the subject-matters of claims 1 and 13 again appear to lack involving an inventive step.

**Claim 6**

In the method of D4 (see column 10, lines 21-22), the nuclear material is placed in an appropriate container and a cementitious material is added and allowed to at least partially cure.

Thus, the subject-matter of claim 6 does not involve an inventive step and does not satisfy the criteria set forth in Article 33(3) PCT.

**Claims 7-11**

The features of claims 7-11 are merely straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.

Thus the subject-matter of said claims does not involve an inventive step and does not satisfy the criterion set forth in Article 33(3) PCT.

**CLAIMS**

1. A method for the encapsulation of a nuclear material which comprises treating the material with an encapsulant which comprises a cementitious material and curing said cementitious material, characterised in that said nuclear material comprises uranium metal or Magnox fuel elements or fuel element debris.
2. A method as claimed in claim 1 wherein the cementitious material comprises Portland Cement.
3. A method as claimed in claim 1 or 2 wherein the cementitious material additionally comprises one or more inorganic fillers selected from blast furnace slag, pulverised fuel ash, hydrated lime, finely divided silica, limestone flour and organic and inorganic fluidising agents.
4. A method as claimed in claim 1, 2 or 3 wherein the cementitious material is provided in the form of an aqueous composition.
5. A method as claimed in claim 4 wherein the water content of the composition is in the region of 40-50% (w/w).
6. A method as claimed in any one of claims 1 to 5 wherein the nuclear material is placed in an appropriate container and a cementitious material is added and allowed to at least partially cure.
7. A method as claimed in claim 6 wherein elements of the nuclear material are either arrayed in the container or mixed haphazardly.
8. A method as claimed in claim 6 or 7 wherein the container is subsequently capped.

9. A method as claimed in claim 6, 7 or 8 wherein the container comprises a drum having a capacity in the region of 500 litres.
10. A method as claimed in claim 9 wherein the amount of nuclear material stored is up to 52 elements.
11. A method as claimed in claim 10 wherein the number of elements is of the order of 22.
12. A method for the storage of a nuclear material which comprises encapsulation of the material in a cured cementitious material, wherein said nuclear material comprises uranium metal or Magnox fuel elements or fuel element debris.

P100377WOclaims2